Applications of Perspective Text Analysis
A Thematic Overview

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Abstract   This thematic overview presents some studies on the validation and verification of Perspective Text Analysis (PTA). The first section, containing the validation part, provides evidence for the hypothesis about the capacity of PTA to reflect specificity of ecologically specified observations in text production. The following section presents verification studies within various contexts and focuses on individual prerequisites and constraints that are at work when a person is put in a situation in which he/she is required to act adequately. These studies are divided into five main parts. The first is concentrated to clinical situations, the second to learning environments, the third to business organisations, the fourth to ideological contexts, and the fifth to the area of consumption. Finally, two sections present some experimental studies on instruction, which gives reasons for the construction of materials on evolutionary grounds. Founded on these materials, results from a longitudinal experiment concerning two individuals' development and growth in schooling situations are presented and discussed.

Contents

Perspective Text Analysis – Introductory Remarks

The method Perspective Text Analysis (PTA) has a long history. The baseline for it was drawn already in the 1970's in the book *Computer-based Content Analysis of Interview Data* (B. Bierschenk & I. Bierschenk, 1976). Moreover, based on the assumptions presented in this publication, B. Bierschenk (1982) made public an ecological model for symbolic processing in the journal *Perceptual and Motor Skills*. From the middle of the 1980's, an era of theoretic and experimental work started, and this work has been continuously published in the form of reports, reflecting the ongoing projects. The start-up is visible through titles like

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Steering Mechanisms for Knowability (B. Bierschenk, 1984) and *The Schematism of Natural Language* (I. Bierschenk, 1984). After the method had been implemented as a computer assisted system, called *Pertex* (Helmersson, 1992) it was widely used as a course tool in Higher Education.

During the 1990's a new period of development took place, founded in the Kantian concept *Schema Axiom* (e.g., B. Bierschenk, 1991, 1993a) and *Pendular Movements* of text building (I. Bierschenk, 1992). The publications from this period are presentations of PTA at a great number of international conferences in Psychology and Cognition and related areas. As a consequence, PTA showed up in handbooks on methodology in the social sciences, concerning both theory and computer applications (B. Bierschenk & I. Bierschenk, 1993; Bierschenk, Bierschenk, & Helmersson, 1996). *The Essence of Text* (I. Bierschenk, 1999a) is an account of the status of the linguistic part so far.

From the late 1990's onwards the method has become more closely tied to developments in the investigation of complex systems, non-linear dynamics, and self-organisation. It now connects to string theory and space dynamics, hence the title *Geometric Foundation* (B. Bierschenk, 2001) and the biological concept *Heterogeneity* (I. Bierschenk & B. Bierschenk, 2004). *Vertex* is the name of this new version. It was presented for the first time in a laboratory course/workshop for students and staff at the Universities of Lund and Münster in 2003.

By this new-orientation it has been demonstrated that the method is valid over languages. For this reason, Tutorials in several languages together with Solutions are in preparation. A recent report is a substantially revised edition, which serves as a synthesis of the theory of language ecology, its methodological operationalisation on text, and experimental outcome (I. Bierschenk, 2011).

Theory and model applications

Although the purpose of this report is to give an account of studies where Perspective Text Analysis has been applied in various contexts, questions may arise as regards discussions of the underlying theory and model in the literature without empirical application. I will give some examples in this initial subsection.

Dahlgren (1988), who participated in a faculty course, took the opportunity to make a model oriented discourse on PTA, where he discusses the components, their operations and the outcomes with illustrative examples. His main point is to consider the validation problem in relation to his research area, invisible religion. He takes his point of departure in theories related to the sociology of knowledge and concludes that the Agent-action-Objective (AaO) paradigm is particularly well suited for individual-based studies.

After its international introduction, PTA has been reviewed as one of the most complete analysis systems. In his book on computer-assisted text analysis, the theoretical sociologist Popping (2000) gives a thorough outline of theory and model prerequisites of PTA. Popping in particular focuses on the Agent as model component and recognises that this component is necessary if one wants to control consciousness. He thereby refers both to the underlying Schema axiom and the earliest works on the way mentality is embedded in syntax.

The model has also served as a source of inspiration to a Masters thesis in Cognitive Science at San José State University. In referring to Popping, Cangiano (2005) concentrates on the idea that intentionality can be detected structurally and therefore can characterise mental models that govern language production. What seems to have been relevant to this user is the Kantian approach.

Why this novelty?

When PTA was first presented in a faculty course at Lund University it had an immediate success. No wonder, because, at many university departments, students and colleagues had for a long time been discontent with the research instruments at hand and wanted to find out ways to circumvent the problems of sampling and bias, that is, subjectivity. Let me take a concrete example: We all know that the area of research on and the scientific approach to textual materials is one of the most widely spread activities in Higher Education. Most often students at all levels and courses are sent out in reality to collect interview data and return to the university department with an amount of text, which they have no idea how to approach. Their teachers or mentors suggest that they should put a semantic content analysis raster on the texts in the hope that some interesting findings will come out of it, although they know that this method will not stand a trial, in the long run. Because, for years students and researchers in the social and behavioural sciences, physicians, clinicians, lawyers, policy makers, marketing investigators, and other professionals have become aware that the various kinds of questionnaires in use cannot measure anything else than what the investigator expects. Aware of this, investigators may fix an opinion poll, a fitness test or clinical research data, yes even an interview, including all the uncertainties that this may bring about for single individuals, education, and society as a whole. So, for a long time the scientific community had searched high and low for a new measuring instrument.

Another circumstance that strongly contributed to the use of the method is that students and researchers had not found it helpful to consider current methods in linguistics, because these are based on deductive models. I have been told that even linguists working in the applied fields could not contribute in any fruitful ways when they were asked to assist in methodology. With this new method available university people found it worthwhile to consider text data for their investigations, because now they got a method suitable for single subject studies. The method namely lays bare the text producer's perspective on a subject matter, which is exactly what usually is asked for in various text-based studies, such as interviews. A speaker's or reader's perspective cannot develop within single clauses and sentences, as for example in answers to questions. Therefore, this method allows free verbalisation, so that prejudices and attitudes, which both the investigator and the text producer may have, do not enter into the analysis. The method, namely, is inductively working.

The central component in PTA is the Agent, which is the governor of the process of perspectivation. Without the Agent function, studies based on language and texts becomes unconditionally reduced to a processing of objects, independent of the researchers' interests in human action and thought. This may easily be confirmed by an inspection of the literature on content analysis that is still abounding the market in social science, economics, medicine, and communication for example. In the following a number of case studies will be reviewed, where researchers have chosen to recognise the "experimental subject" as the responsible agent in the production of essential information.

Validation Studies

Laboratory Contexts

Throughout the developmental history of Perspective Text Analysis a concern about the capacity of language to precisely depict an observer's direct pick-up of information became the objective of several studies on the internal validation of the method. Clear correspondence between ecologically defined properties of observations and the a-priori assumptions of the method of analysis has been found. Likewise the validity has been examined by means of a critical analysis of the conceptualisations of a model builder, whose

work in fact was not in pace with his model. In addition, the axiomatic Agent-action-Objective (AaO) mechanism has been studied as to its capacity to reproduce invariance in translations, which could be taken as evidence of its biological anchorage.

Seeing and saying

A series of experiments have been based on the ecological theory of perception as formulated by James J. Gibson (Gibson, 1979) and applied in the Visual Cliff studies (Gibson & Walk, 1960). The Visual Cliff is an apparatus consisting of a table with a heavy glass top, on which babies were placed and lured to crawl over. The question was whether the children perceived the depth and refused to move or not.

Departing from the hypothesis that environmental observation can be precisely reflected and communicated in language, in bees as well as humans, a number of validation studies have been undertaken. B. Bierschenk (1991) reported for the first time on the analysis of the ecological affordance in the figure caption of the Visual Cliff experiments (*Scientific American*, 1960, p. 65) used in the present context. The concepts of the observing person's expressions were proved to carry the assumed ecological significance. This analysis was based on an early version of the method.

A reanalysis was made (B. Bierschenk, 2001a) with the premise that the self-referential mechanism of living systems is reproducing itself in language. The experimental hypothesis concerned the capacity of the AaO mechanism to take care of the natural properties of language that handle discontinuity in the production of language spaces. Thus a verbal expression must contain cues to stretching and straining. The hypothesis was confirmed in the sense that A- and O-spaces, which were produced by means of a SigmaPlot graph program, are in perfect correspondence with the theory: the folded O-space concentrates in *Depth*, and the A-space in *Refusal*. It can be concluded that the method functions consistently despite refinements made over time.

Model builder

Within joint seminars at the Centre for Environmental Studies at Lund University, a doctoral student formulated a hypothesis on the ecological prerequisites for land use in Iceland, a subject of an ongoing research project. For this study, he was asked to explain his consciousness about land use (B. Bierschenk, 2003), which he did with an asymmetrically designed Causal Loop Diagram so as to simulate the dominance of temperature in relation to land use. In contrasting the manifested minor loop relation between land use and temperature with the model builder's thesis writing, it could be concluded that the awareness pictured in the model could not be validated and verified. It turned out that the model builder, despite his aim of discussing the effects of temperature on land use in his thesis, in fact is discussing the variations of temperature over time. The aspect of temperature, associated with the *use* of land in Iceland is not verified.

At the same centre, teaching materials on the Easter Islands have been central for studying the growing and sloping of a civilisation. This time a diagram was formulated that modelled the relation between population and resources. The crucial question is, however, how to interpret the circular links. Seen in one way, the model implies that individuals of a population are dependent on their access to natural resources and that these resources influence the behaviour of a population. This linkage states a reciprocal relation in a type of organism-environment interaction. Seen in a non-Darwinian perspective, i.e., as a nonlinear relation, the model requires a differentiation between system identity and environment. The study of the model builder's conception (B. Bierschenk, 2004) shows a lack of the morality component that differentiates out a perspective from the objective. In other words, without a verbal description the model has no theoretical (synthetic) validity. These findings caused

some turbulence at the department, because there was no doubt as to the preciseness of the method used for discovery.

Translators

With the purpose to find out whether the Agent-action-Objective axiom (AaO) can reproduce language specific spaces with an invariant structural kernel, an original English quotation in which the concept of behaviourism is defined, was first translated into Swedish by an established researcher, who is familiar with the theory. Thereafter this translated version was translated into Italian by an upper secondary teacher of Italian language, philosophy, and psychology. Two reasons governed the design: The quotation has a rigid textual surface, judged to give a severe restriction to the translation. The other reason is that it is a clear-cut expression of an idea. Further, translation into Swedish for sure means translation into a different language, but Swedish and English are more close relatives (the German family) than are Swedish and Italian. This second step translation was considered a complication, so the Italian translation carried the experimental burden (B. Bierschenk, 2002a).

It turned out that the English original and the Swedish translation are in phase all the time and the spaces have the same shape. The Italian text has produced another dynamic, which seems to be in anti-phase sometimes; it turns more and bends more, thus it is more implicit and more extended. It seemed as if the translator of Italian deviated seriously in perspective, which would have caused a breakdown of the similarity in shape. Nevertheless, the textual constraints have enforced the same shape onto the space. It can be concluded that in spite of the Italian translator's effort to do a good job in working extra hard with the formulations, this did not negatively affect the validation. On the contrary! There exists an internal structural coherence between the shapes that can only be taken as biological similarity.

Another translation study concerned an original Swedish text portion of an interview that was compared with its English translation. The text was taken from research materials, handed in by two doctoral students of Economics and Business Administration and the verbal production stems from a community official. Hence, it is quite authentic and has the typical verbal characteristics that can be expected from interviews. In two reports (B. Bierschenk, 2002b, c) the folded spaces were compared and it is concluded that despite thermodynamic trajectories that differ somewhat in direction and orientation, the biological roots of the AaO mechanism account for the established conceptual commonalty. The translator has reproduced the invariant meaning of the Swedish text but has involuntarily posed a personal perspective on it with variable pattern movements as its effect.

It now became interesting to observe whether the same result could be reproduced when three more languages and two more translators were added. The A- and O- graphs show the same general result. There are restrictions as to the extent to which a translator can use language specific variability without losing the correct orientation. These translators have weaved their own perspective into the flow, whereas the objective of the text is the same over the five texts, evidence of the axiomatic description of the Agent through the Objective.

Verification Studies

Clinical Contexts

Some explorative studies carried out in clinical settings are presented in this section. They all connect to the world of medical or psychological treatment. A few studies concern the predispositions in parents or mothers in relating to their children in a caring situation, another is a patient's mastering of his sickness. The last case concerns the conception of impairment (ADHD) as verbalised by two professionals.

Parents

A first hint of what is meant by perspective as basis for the measurement of competence is to be found in some studies, using the ecological theory (B. Bierschenk, 1993c), which were summarised for an international audience in Bierschenk and Bierschenk (1993). The chapter reports on the testing of parents' perception of risks for their babies as reflected in their written comments to the Visual Cliff pictures (see section on Theory founders above).

It turns out that the attitudes and personal interests in life help to position the person in front of a situation. Thus when the person reports on a situation in his environment, he uses language cues which structure the environment differently depending on whether his attitudes are formed by aesthetic-moral, social, caring, practical, or physical-technical interests. This result may be regarded as prospective, because before one can measure some perceptive ability, learning, or competence one has to take into account the pre-stage of *inter esse*.

Patients

In a research project at Lund University Hospital on rheumatic patients, structured interviews were carried out by psychologists, who would find out what happened to the patients during and after the treatment at the hospital. The text from one patient was selected for an explorative study (B. Bierschenk, 1993d) of the mental effects of medical treatments at three interview occasions. At the first interview the patient thinks he is incapable of handling his environment because the rheumatism is limiting him. The second time the patient feels less vulnerable and can see possible ways of mastering the state of the sickness. At the third occasion, the patient is accepting the routines of the treatment and everything that belongs to the changes in life conditions. In the perspective of the patient it is now probable that he will adapt, so as to be in command of himself.

In another clinical context, a doctoral student in psychology studied the way parents, especially new mothers, react to the birth of an impaired child (Larsson, 1994). His main result is that mothers follow either an emotional or a methodological line of thinking as they relate their conceptualisations of the traumatic situation.

Professionals

By the end of the 1990's, there was a lively debate in Sweden about the so called ADHD syndrome, which is short for Attention-Deficit Hyperactivity Disorder. Professionals and school practitioners were engaged in the question whether this syndrome is anchored in biology or is a social concern. Especially two circles developed: On the one hand, physicians argued that the syndrome is a disease, which should undergo medical treatment. On the other, sociologists pointed out society as responsible for the development of the ADHD behaviour. Especially the latter conduct contributed to a feeling of guilt in parents, which intensified the debate further. In connection with the tutoring of a student, two interviews about ADHD were accomplished, in which a physician and a nurse, turned sociologist, took part. They were given the task to describe in writing the syndrome the way they conceive of the problem and its solution. B. Bierschenk (2001c) summarises the results as follows:

The sociologist's view of the problem is that children with an ADHD diagnosis are mistreated because of the disorganisation and discriminatory practice at the clinic. In depth this respondent takes an extreme position and invalidates the entire medical perspective, which results in disadvantage for these impaired children. The medical doctor's analysis shows a more firmly described problem awareness. It concentrates on the importance of diagnosing the patient and to be able to discriminate between various syndromes in order to be as secure as possible. After manifestation, a correction of the disorder can take place. An

impaired child is regarded as a misfit, and in depth the focus is on treatment of a disease. Thus the method could confirm the disparate approaches among professionals that were visible at the time of the debate.

Learning Contexts

The studies reported in this section are based on materials produced by persons enrolled in education of some kind. Common to these learning situations is the interest of the researchers to observe in what respect there are differences in consciousness between persons in performing similar tasks. The studies of pairs have contributed to the verification of earlier assumptions about the complementary minds of twins and the complementariness in social conduct of class mates. Some studies are exploring differences among students at various levels in their ability to structure their social context.

Twins

A study in a gymnasium school in the City of Malmö, Sweden, concerned the understanding of an apparatus for measuring the physical phenomenon of depth perception, known as the Visual Cliff (B. Bierschenk, 1995). At four occasions the students were given the task to describe their understanding of this technical device in the form of a narrative. The question concerned the ability to produce qualitatively similar texts written in the students' first language compared to a text written in their third language, French. Two monozygotic female twins were then selected for the study with the idea that monozygotic twins are supposed to have identical biological preconditions.

The two girls produced fairly similar texts, seen to the lexical level, and no differences could be detected with respect to language either. However, at the conceptual level the twins took a different perspective. One perceived the laboratory properties in the design and use of the technical apparatus, whereas the other had a social perspective in her text and perceived the consequences of the use of this apparatus. But on the whole the two girls both showed an understanding of the experiment.

The same picture materials were used in a second study (B. Bierschenk, 1996). This time two dizygotic twin boys at a gymnasium in the City of Lund, Sweden, were selected and their classroom task had been to write an essay in their first as well as their second language, English. They had to make two rewritings in each language to reduce the amount of text to less than 200 words, based on the idea that an abstraction process would make it difficult to maintain the level of performance over languages. Nevertheless, no difference could be noted in their ability to switch over to English, and both performed quite equally regardless of language.

However, conceptually they were significantly different – to one another and to the twin girls. One of them perceived the experimental set up and its purpose while the other did not. He ended up in a sense of uncertainty about the description of the apparatus and insecurity of the action of the child. Evidently there are no differences in language production between the two twin pairs. However, there is a slight difference in perspective within the monozygotic twin pair. Within the dizygotic twin pair there is a profound difference in their structural manifestation, since one of them did not grasp the fundamental idea of the experiment.

Problem solving pairs

Another female pair was examined in connection with a course at the Danish BA level in psychology, where an examination paper was to be written (Elstrup Rasmussen, 1997). The students had the opportunity to select their co-writer, which should guarantee the best possible collaboration. The research question concerned how collaborative work develops in this

environment, which the students were to describe during the process, both the expected collaboration and the real. The same kind of result emerged at the psychological level as at the biological. In this learning process it was evident that one partner develops leadership since she is competence oriented, whereas the other is more socially sensitive and develops toward administration of the task.

A study from another learning context is reported by Bang and Elstrup Rasmussen (2000). Two female students in physics participated in a process where the dialogue was to be governing for their problem solving strategy. In this case, the experimenter formed the pairs. The learning situation concerned the concept of resistance. The analysis of the dialogue showed that one of the students was knowledge oriented and eager to steer the process forward, while the other was concentrated on distracting and stressed social aspects of the communication.

Qualified versus competent students

In an experiment on self assessment, three classes from a gymnasium school in the city of Malmö were given the task to prepare for writing an essay about Sweden as their referential society (B. Bierschenk, 1992). Criteria for grading the essays were set up and the students were informed about the importance of being aware of these to achieve a high level of accomplishment. Four students with extreme results were selected on the basis of the teacher's grades and were asked to grade their own essays. Two of these students showed an awareness of their low and high performance, while one student has underestimated his performance and one student has overestimated his. The student with a high awareness of his performance makes a sophisticated discussion of the contemporary Swedish society, thus showing a high degree of competence. The student who departed most from teacher grading showed a performance which is more in line with classical qualification properties, since his essay marks a restricted outlook.

An explorative study concerning problem solving in a simulated business setting was carried out by researchers in organisational and educational psychology in Copenhagen (Elstrup Rasmussen & Jensen, 2000). Three teams of two economy students each were given the task to prepare for a simulation of the construction, production and selling a product. The researchers' aim was to study whether the qualifications that the students gained from reading and working together would trigger some competence potential for business enterprising. After four days of logbook writing and a dialogue on their decisions the pairs were asked to come to a conclusion as to what country they have chosen for selling, production, etc. One pair was examined, which showed no other decision repertoire than what the manuals had prepared them for. In this respect, they were qualified but could not manifest any competence.

Economists versus technologists

A fundamental condition of the studies presented is an extensive course activity, primarily on the doctoral and faculty levels. One explorative study was carried out together with students in business administration and civil engineering at Lund University, and also business professionals, with economic and technical background (B. Bierschenk, 1990). The study compared the four groups' consciousness, measured in terms of conceptual development in structuring one's social context. The response texts were narratives about one's making a living in an environment stipulated by the principle of growth. Most developmental progress showed the doctoral students in civil engineering when compared to students in business administration. The professionals of both groups did not show a reasonable degree of consciousness. An existence worthy of moral respect seems to be the missing link.

Business Contexts

Most important among these studies is that PTA has been central for both problem formulation as well as measuring device. They concern management and entrepreneurship, two research areas for which the method could contribute with new insights from leadership to labor taking. It is worthwhile mentioning that the outcomes of this research have had practical impact on the organisations in question.

Managers and entrepreneurs

In a doctoral work about strategy and legitimisation at the Department of Business Administration, Lund University, annual reports from an energy company were in focus. The method was tested on a portion of this material. The research question concerned whether strategies and visions for the future could be read out from three annual reports, 1979, 1981 and 1983. Since the results were not explicitly used in the dissertation, they are reported in an unpublished paper (B. Bierschenk, 1993d).

The quality in the conceptualisation of the manager of 1979 emerges through a derived consensus. A policy is formed, which is founded on the idea that both individuals and companies respond with perfect foresight in front of economic incentives and warnings. But it is not effective when it comes to adaptation to consumer factors. Therefore the company decided to reorient and shifted the manager in favour of a person with another vision. The new manager's first annual report 1981 showed that a market adaptation had occurred. He drives to secure synergy effects, which means a qualitative change of energy production. His visions for functional synergy in 1983 lead to his retirement in favour of economic reality.

Two doctoral students at Umeå School of Business and Economics, Northern Sweden, have made extensive observations of actors' conceptions and strategies for local development (Gabrielsson & Paulsson, 1989, 1996). By means of deep interviews of two dominating actors in two communities, the authors could show that two actors with similar background had a different conception about nature. One is governed by concepts related to entrepreneurship, the other by concepts related to ecology. The authors note that the two actors still have had possibilities to act according to their personal concepts because the two communities were quite similar in general structure. For this study the authors received the ANBAR-prize Citation of Excellence "using Bierschenk's novel technique of perspective text analysis".

In their doctoral work (Gabrielsson & Paulsson, 2004), which is a longitudinal study, covering fifteen years, the authors come up with a theory about the individual in strategic processes, based on the idea of agency. They apply their model, called Strategic Concepts of Action (SCA) on some strategic processes in local economic development. A main result is that the SCA seems to capture a mechanism that can explain developmental processes when realised in a strategy. Congruence between single individuals and the strategy, at least partly, could be detected. In practice, this means that a group would always profit from the kind of individuals, who take an agent role, conceptually and socially, i.e. strategists.

Entrepreneurship was governing in a study of small-firm owners (Mattsson, 2001) accomplished at Halmstad College, South of Sweden. Eight entrepreneurs were examined with respect to their conceptions of business climate, future visions, and intentions for growth. Growth was identified as either winning or threatening. A main finding was that some small-firm owners focus on possibilities while some concentrate on problems. Possibility seekers are the ones who have a greater employment potential and growth intentions than problem enhancers.

In her doctoral dissertation (Mattsson/Ulvenblad, 2009) the author deepens the analysis of individuals' intentions for growth. She recognises two main aspects of growth, a pragmatic one and an institutionalised one, where the first refers to visions and the latter to survival. Both are related to the will of the entrepreneur. Further, communication practice

reveals that the skill of an entrepreneur is highly dependent on experience and education, a fact that could be seen in the communicative behaviour of the entrepreneurs: the development goes from singleness to complex relations. Thus will and skill go together in strategic entrepreneurship.

Related to the skill concept in business ventures is the potential of a company to integrate a variety of knowledge among its collaborators to build the intellectual asset base of the firm. In a case study of an Australian biotechnological company (Hine, Helmersson, & Mattsson, 2007) the authors focus on the knowledge reflected in responses of four directors' articulation of the intellectual capital they offer to the company. The result of the text analysis shows that the individual knowledge would not be enough in the long run because of its disparate nature. Instead a collective intellectual capital is more important for the company, since it builds on sustainable collaboration.

The weak leader

An organisational psychologist was interested in measuring competence related to leadership. The case concerned whether a major Danish service company had found the appropriate reasons for promoting one of their employees by using various kinds of tests, such as self-assessment, personality and intelligence tests, and a psychological interview. The candidate's responses to these tests were analysed in the traditional way (analytic model) by a professional consultant of a headhunting firm, and his verbal responses in the form of a free text production about leadership was analysed with PTA (synthetic model) for comparison (Elstrup Rasmussen, 1994).

Although the author mainly reports on the intrinsic qualities of the two models, there are conclusions to be drawn from the question of leadership. According to the analytical model the candidate would be a type of leader who tends to produce a court of favourites to implement his ideas, because he has a creative but insecure personality. The synthetic model produces great similarity in many respects but there are fundamental differences. For example, 'insecurity' is not a characterisation of personality but merely as a way of strategic acting, leading to the concept of enlightened despotism. The author shows that the desired competence of a leader cannot emerge by means of ordinary test batteries.

Mechanics

Problems with the information structure in its service manuals became acute to the Volvo car industry in the beginning of the 1980's. A feeling that the mechanics conceive of the information differently depending on the country in which they work made the company seek assistance from researchers, among others two doctoral students. A questionnaire had been distributed to garages in several countries, for example Sweden, West Germany, England, Italy and the USA. The final question was of a so-called open type, which on behalf of the industry was analysed separately.

The report (B. Bierschenk & I. Bierschenk, 1987) could show that Volvo should adapt its service information depending on the country to which it shall be directed:

The conception of service information in *Swedish* mechanics shows that among them there is no interest in technical information whatsoever. The reason for this is to be found in the working climate.

The *English* mechanics are to a higher extent prepared to do a job. Information quality is a key word, supported by service support and that the organisation of the information is important. In the depth lies a demand for greater coherence between the support and the service user.

In Germany (West Germany, by the time of the study) it is self-evident that high quality service is a key word. The *German* mechanics are anxious that they cannot maintain

knowledge. For them a measurement of standard is the basis for the answers, which implies that the German mechanic wants to compare his skills with the new information in the service manuals to be as efficient as possible.

To the *Italian* mechanics information structuring is a reason for being able to make a good job. They are not sure that they are sufficiently able and very much wants to acquire the necessary knowledge, they want to be capable. Tutoring is asked for in Italian garages.

US mechanics mean that the company does not recognise their ability and therefore does not authorise them sufficiently. They are of the opinion that the company gives them insufficient information purposely. Since the reason for the answer is that they express their unambiguous comprehension, they think that the company does not meet them with worthiness.

With the purpose to highlight the Agent concept as steering component in linguistic analysis, a comparison was made (I. Bierschenk, 1987a) between the five cultures based on the Volvo materials. The AaO model was tested on the question-response relationship, which reflects consciousness as super- and subordination. It was found that certain responses related to the perspective of the question, interpreted as coherence between worker and industry, while others expressed an individual, integrated, perspective. English and Swedish workers respond to the industry's questions in conceiving themselves as objects. They subordinate themselves to an authority, which Italian, German, and US workers do not.

Ideological Contexts

The studies in the following section have come about as the result of discussions in interdisciplinary courses and scholarly seminars, so therefore the materials show a wide scope as regards the research question posed. Although disparate contexts, from the perspectives of classical scholars to cooperatives, there is, however, sameness in the focus on the individual's mental conduct in an ideologically determined cultural or societal sphere.

Classical scholars

Within a European project around the 1950's there had been an aim to achieve a modern material of classical texts that were conceived to contribute to the common history. An example is the translations of Tacitus' Germania. B. Bierschenk (1993b) made a study of the Latin original to Chapter 44 (about the 'suiones', Swedes) and its translations into Danish, English, French, German, and Swedish. The scholars who made the translations were contemporary academics, who had the possibility to collaborate on this undertaking. This fact became vital when the language variants were compared with respect to the elasticity in their verbal flows, and to their information structure. Since the historiography of Tacitus is usually characterised with the concept tacit knowledge, the question was whether these classical scholars had interpreted Tacitus in similar ways.

The comparison demonstrates that the original and its translations show the existence of a dividing line, a "limes of thought". There are perspective similarities regarding intention and orientation between Latin, French, and English on the one hand, and between Danish, Swedish and German on the other. A complementary study (I. Bierschenk, 1994) added the Italian language to the comparison, although this translation was accomplished forty years later. However, as expected, Italian is positioned together with Latin and French, while English at this occasion is separated out, i.e., forms its own line of thought.

Idealists

Issues of religion were still at the beginning of the 1990's something belonging to the domains of the public. A researcher in sociology of religion at Lund University studied missionaries' reasoning behind their preference of attending missionary schools (Dahlgren,

1990). The common opinion is, according to the author, that reading stories in the missionary papers would be the reason why one tried to join the missionary corps and do good things. The analysis of a curriculum from an applicant gave the same information on the surface, but at a deep analysis it was evident that his personal salvation is in focus and the wish to deepen his salvation experience through increased awareness. The conclusion drawn is that it is the education at the evangelic missionary school that the curriculum writer is yearning for.

Civil religion is a term used by Pétursson (1991). By this name he means the collaboration taking place since the 1960's between ecclesiastical and profane authorities in Sweden. The author analysed speeches given by Olof Palme 1965, 1968 and 1983, and the archbishops of the same times, Ruben Josefson 1968, and Olof Sundby 1983. Palme's speech of 1965 is characterised by human rights. In 1968 it is international solidarity and in 1983 the non-utopian global planning. After a deep analysis of the speeches, only the year of 1968 seems to have been a time where there was a bridge of civil religion between church and politics. The author concludes that the close associations that could be noted by the end of the 1960's were not followed up on the ideological level. Palme and his archbishop went apart.

At the Faculty of Law, Lund University, projects have been carried out regarding how to solve for example family conflicts that accommodates the best interest of the child. An area of discussion and study is the idealistic view on joint legal custody, which means parental responsibility. It follows that children should be heard when investigated by the authorities and in different custody processes even when their parents do not live together. When there is no consensus in court between parents, negotiations may come about in the form of so called mediation conversations. In a text analysis of such mediation participants, Ryrstedt (2009) comes to the insight that the conversations are not to the best of the child, but rather to the parents, despite children's legal support.

Cooperatives

Two teachers in business administration have contributed within a faculty course with an empirical material from their studies on consumer cooperatives in Sweden. The material was taken from National Government Reports and the text portion selected for analysis was judged to be the most significant policy statement within the cooperation. The policy means in short that the effectiveness of the cooperation lies in its ability to control the associations. The proper basis for the policy is the purpose to draw the borderline for the cooperation and influence it ideologically (B. Bierschenk, 1993d).

The theme of another project at the same department was collective problem solving in cooperative companies. An explorative study (I. Bierschenk, 1987b) is on how the members of a cooperative for agricultural interests conceived their organisation. They express a discontent with the organisation and mean that it is dominated by collectivism and bureaucracy, which are counteracting the idea of cooperation. The ground of this conceptualisation is a demand for ethics and a missing contextualisation, in other words, the organisation acts as if the members are only customers.

Consumption Contexts

Most of the following studies are explorations made by researchers interested in consumer behaviour. Connected to these investigations is also an interest in testing PTA, comparing it with traditional content analytic methods, and express the benefits it can offer theoretically and in practice.

Customers and consumers

Customer preferences were compared within two Swedish organisations, one cooperative and the other private (Helmersson, 1997). The texts contained the motivations

behind customers' choice of daily store. The results show that the typical private store customers act stably and further are associated with need for quality, thus they never go to the cooperative. The customers of the cooperation, on the contrary, seek new orientation because they feel constraint by the cooperative traditions of the organisation, because of its lack of quality. Thus individual actions could be detected in the cooperative customers; they were prepared to go shopping at the private store, if necessary.

In general, this result tells something about the image of the organisations and the direction in which they need to adapt to their customers. But customers act differentially, as was found in another study on consumers' projection when reading advertisements (Trosslöv Aronsson, 1997, 2001). The author means that idealised images attract people and draw their attention, but may also create dissatisfaction and unhappiness. By using a projective technique four consumers' (females) texts were generated in connection with viewing idealised images in the advertisements of a chocolate product. The results could show that either the image reflects an idealised icon, or is regarded as manipulative on the consumer's projection.

Consumers' choice of organic versus conventional fruit and vegetables was the subject of two joint studies in economics and horticulture (Ekelund & Tjärnemo, 2004; Tjärnemo & Ekelund, 2004). The behaviour of consumers in choosing fruit and vegetables differed depending on whether they were in the store for buying or not. Consumers who bought organic fruit and vegetables were health-oriented while those who did not were meal-oriented and were in the store for planning reasons. Since organic fruit and vegetables were perceived as coherent only with the first group's health-oriented buying, the study highlights a difficulty for retailers and store owners because of the choice of the less devoted majority.

Fast food is another area of study that has grown with the speed of the establishment of fast food chains. Written accounts were analysed as to high-school students' awareness of the good and bad attributes of fast food (Helmersson & Mattsson, 2007a). Female students view fast food in a broad food chain context, whereas male students concentrate on fast eating and satiety. Likewise the favourite product hamburger has been the subject of study where the attributes taste and ingredients formed the resulting preference clusters (Helmersson & Mattsson, 2007b).

The introduction of new technologies in various societal spheres calls for knowledge about the competence of the users of these tools. Helmersson and Mattsson (2001) studied interview data in connection with a commercial set-up in international telecommunications. They further explored into Danish first time internet customers when using the bank service (Mattson & Helmersson, 2005). Although concerned with customer and consumer behaviour, the authors' conclusions are in the first place related to the methods and techniques used. Thus they point to the value of Perspective Text Analysis to distinguish between various user competences in a meaningful way and to enrich qualitative research.

Referring to the demonstration of Pertex made by Helmersson and Mattsson (2001) a group of researchers at Roskilde University, Denmark, made a detailed investigation of methodological problems (Sundbo, et al., 2003) related to the measurements of various competencies in the modern web-based self-service society. The aim was to compare the critical incident technique (CIT) with traditional data collection methods, such as web-based surveys and structured interviews. The contexts for this investigation were three main case studies, students' use of internet, travel booking, and on-line banking. For summarising the responses to the CIT questions PTA/Pertex was used. The authors acknowledge that albeit the very heterogeneous sample, the text analysis could discriminate among the textual responses.

Construction of Instructional Materials on Evolutionary Grounds

The construction of learning materials is the focus of this section. A series of experiments were designed to study the structure of text materials, especially fiction, with the purpose to gain control over its level of conceptual difficulty in matching it against students' level of comprehension. The overall idea has been that fiction contributes to education provided that it is based on a conceptual structure (depth) that develops competence as distinct from qualification, the usual issue of schooling. These studies have shown a way to control the structure of educational materials and to make diagnoses about the intellectual ability of students on structural grounds.

Literature and Society

The starting point for an investigation into the structure of a material is a competence oriented experiment on the comprehension of ideas in modern literature. Comprehension is defined as being indicative of competence as distinct from qualification. 117 students from various educational programs in a gymnasium school in the City of Lund, Sweden, participated in a course on modern literature and society (I. Bierschenk, 1997, 1998). In the course, the students were exposed to three video recorded projections of model societies, a material produced by Biological Science in Boulder, Colorado. The societies represent three dimensions of ideas: The Affinity or Behaviour modification model, the Structure or Gestalt model, and the Process or Cybernetics model.

The models have been experimentally connected to behaviourism, structuralism, and functionalism respectively by B. Bierschenk (1978). This dimensionality was discussed in class in relation to the literary and cultural concepts of the so-called isms in literature and art (futurism, expressionism, etc). Thus the students were asked to investigate how these concepts or ideas have been transformed into models of society (on video) as well as into fiction (novels). Behind this reasoning is the idea that the goal of education should in the first place be to reach competence (not qualification), which is connected with comprehending and attuning to civil life. One major bridge is to comprehend literary texts. Since literature is most often structuring societal life at different levels, ideas of a society should be embedded in literary texts. Luckhardt (2010) has adopted this idea of interrelationship between society and culture in her discussion about the role of fiction in preparing students for the American multicultural society.

A comprehension test consisted of 15 items, each one an indirect description of a modern literary/cultural concept in function. The comprehension of ideas, in the study defined as competence, was proved to be equal among students in arts, natural science and social sciences. But the concepts differ in depth from one another. This was a result of a differentiation between concepts in relation to their degree of difficulty in comprehension (structural depth), as shown in the students' responses, and not a differentiation between classes. The degree of depth could be established by binding the concepts to the three paradigms mentioned above, for which the structure was already known. In this way the theoretical anchorage of the test could be empirically decided. By means of this test a scale has been developed, denoting four evolutionary steps or levels, which can be used to steer an instruction process or competence development program.

The version used of model societies was a picture series, put onto VCR records together with sound. In what way pictures differ from text will not be discussed here. But it was evident that the text in the literary test that described the idea of behaviourism was easiest to recognise, although it is not clear why. Therefore, a follow-up task has concentrated on the investigation of the item texts with the aim to get control over their deep conceptual relations. Four studies will be reported, in which PTA has been applied in the planning of instruction.

What the behaviourist knows

The first study of the theoretically defined text material concerned the fundamental idea of behaviourism. The question was, quite naturally, whether the theory, which is well known, is reflected in the text, so that it could function as a reliable test item (about 50 words) to measure what it was intended to measure. In I. Bierschenk (1999b) an analysis of the conceptual relations of the text is reported and also the dimensionality expressed by the topological form of representation. The concepts denoting the dimension are given in parentheses.

The study points at four very typical dimensions, one denoting machine related terms (Effectiveness, Technology), one taking up the method aspect (Working order), one representing design (Shaping, Trimming) and finally one standing for a rise in quality (Refinement, Representativeness). Thus the analysis had picked up the structure implied in behaviourism.

The result is discussed in relation to a suitable application in teaching. Since the point of departure for the test had been the comprehension of cultural and scientific concepts transformed into literature, three literary examples are given of how materials could be selected depending on degree of difficulty, that is, depth. Certain conceptual relations are matching certain novels. The novels discussed were Nineteen Eighty-four by George Orwell, Odin den Ivana Denisovitja (A Day in Ivan Denisovitj's Life) by Alexander Solsjenitsyn, and Kallocain by Karin Boye. The three novels are examples of the way the concept Refinement is deepened. In Orwell's novel it can be studied in its social context, where the model is stronger than the individual. The contrast is given in Solsjenitsyn, where focus is on self-refinement through inner exile, making the individual stronger than the model. Boye gives a perspective from inside about what happens within and between individuals when the system is demoralising life.

In this study it is shown that structural control from the part of the teacher would steer the selection of materials. As a consequence, the teacher is spared from the heavy task to decide on the amount of text and the student would get clear information on what is required of him at a certain level. But this requires that level will be connected to a grading system.

The dropout's competence

The concept of structuralism belongs to the deepest of the tested ideas and is therefore very difficult to encompass to a gymnasium student. To read Kafka is a venture, for example, since the discussion easily lands in the surface bound, organisational aspects of society and human conditions, evidence that structure only with difficulty can be mastered by students of gymnasium age. A cultural expression of structuralism is the expressionism, which among other things comprises chaos, anxiety, and conflict in a mental sense. Another expression is the psychological concept of Gestalt, which is more holistic as a theory of human development and almost the opposite of behaviourism. At this cutting edge lies the concept of war, which, when applied, functions as a destructive force within the Gestalt. Much of this is reflected in modern war novels (e.g., by Erich Maria Remarque, Väinö Linna, and Dalton Trumbo). To test the understanding of such a text at a deeper level may thus be a task to give for a diagnosis without having to consider the deepest dimensions of structuralism.

One study (I. Bierschenk, 2000b) presents an attempt to start a process in a number of concepts from a structure, taken from a text (about 25 words) by Machiavelli. The structure was used as criterion for a writing task in the gymnasium school. Here a process is generated, in which the teacher gives the students the task to explain the war novel they just read by using the words Parrying, Challenge, and Risk. With the help of these words they write a short text, which the teacher analyses by means of PTA and then compares against her/his

own key. If the two structures match, then the students have passed the criterion and consequently the test. The deepest concept should circle around Mastery.

One student is selected for control. The student has not qualified so far, which means that he has received the grade "not passed" on the preceding course and is regarded as a dropout. The test correction now shows that this student did well on the diagnosis. His concepts of Solution, Resistance, and Preparedness lead to the deepest concept Capability. It gives the teacher the answer: This student understands the deep dimensions of the novel. Even though he is not qualified, he is competent. The competence is hidden in the text he produced and was disclosed by the method of analysis.

The result leads to a discussion (I. Bierschenk, 2004) of judgements of qualifications and competence respectively and the implications for a modern educational system. The report states that this is a step to take, if one wants to underpin the idea that the aim of school is to centre round the single student's ability and responsibility. The method is well adapted to point at the unique quality in every individual person and not in classes.

Moral values of a natural scientist

The question of the role of the humanities was considered (I. Bierschenk, 2000a) against the background that many debaters argue in favour of the educating role of the humanities in the development of a society and its citizens. Within natural science there is the awareness, that humanistic values are important building blocks to reach a comprehensive knowledge of the world. Therefore, drastic measures are taken to attract female students to the technological programs, so that the male students may gain from those female aspects of life that they are lacking. As part of a literature course in the gymnasium school, the question of natural science education was connected with the question of moral development by the study of novels with a technical-futuristic theme. The futurism, a leading cultural ism in the beginning of the 20th century, supported progress in every form. In this study, the futurism was redefined to mean a social dimension and in this way it was possible to assume that the futurist novel as a genre would be educating to the extent that the author succeeds in mediating the intrinsic moral value of a society.

The basis for the study of the concepts of futurism was a test item (45 words), just describing social development in the light of modern genetics and its results. In connection with this part of the course a number of novels with a critical outlook were studied, among others Brave New World by Aldous Huxley, En levande själ (A Living Soul) by P C Jersild, and The Hand Maid's Tale by Margaret Atwood. The test item was analysed with PTA and was found to contain among other things a dimension denoting a social climate, whose concept Public Morality was closest to the research problem that had been formulated. With the help of this one and two more words the students of two classes got the task to give their explanations of the novels.

Is the natural scientist capable of contributing to education by representing public morality? The topological analysis showed that the deeper embedded concepts, which constitute the basis of a moral concept, are only present in the novel of Huxley, and he was in fact a natural scientist. This means that Brave New World is the one, which will have an effect on the understanding of a civilisation ideology. P C Jersild, trained physician, has manifested more of personal attitudes of political kind. It is unclear whether his novel will have an educational effect. Atwood, who represents the humanities in this selection, puts forward in her vision of a future society the horror methods, which makes her novel unreliable in relation to morality, seen as scientifically based education.

Some years later, a study was carried out with the purpose to verify the found properties of moral values (B. Bierschenk & I. Bierschenk, 2005). Huxley's Brave New World and Atwood's Oryx and Crake were the experimental texts. A student in fine arts was

asked to reason about similarities and differences between the two novels. The conclusions that the student was able to draw from the reading was remarkably insightful. One main observation concerned human reproduction. The student conveyed the importance of motherhood as central and its relation to morality and thus authenticity. In a time when genetic manipulation corrupts mankind, Huxley's story contains a discussion of sustainable values compared to Atwood's, because it is more realistic in its modernity and thus arouses deep indignation.

How to characterise the writer's style

A research question is whether the structure of a material corresponds to the conventional view. If the teacher describes and explains texts from out of routine study of the subject theory and this is proved to be misleading, this should have consequences for the students' learning but also for the way they are assessed and examined. One example is the common picture of Ernest Hemingway's writing style. In being a modernist he is assumed to have acquired some modern scientific concept or cultural idea and transformed it into literary form. The concept associated with him is the behaviourism.

The 1920's in America were permeated by functionalistic ideas, whose expression at the experimental level was manifested as behaviourism. Thus it was assumed in an experiment on a Hemingway text (I. Bierschenk, 2001) that the writer is functionalist in mind (the ideational level) but behaviourist in practise, that is, at the textual level. This means that the experiment was intended to separate the two levels, just as it may be done in the Visual Cliff experiment (child on a glass top). The design is functionalistic and the events on the glass top can be described in behaviouristic terms.

By an analysis of a portion of the dialogue of about 20 lines in The Killers of 1927 by Hemingway and a representation of the space of the text, it could be shown that the text is very flat, that is, it does not extend under the sea line. Moreover, the orienting space of the text was separated from the intentional space, which resulted in two spaces with very similar shape. As has been experimentally demonstrated, intention and orientation in a text act complementary to each other in an asymmetric way (B. Bierschenk, 2005b). Thus the writer has consciously designed the textual surface so that it would be as symmetrical as possible, to avoid that any depth or implicitness will be the result from reading. The analysis shows that the method functions precisely.

A further analysis (by means of radians) informed that the conceptual relations quite evidently are related to a functionalistic-behaviouristic sphere of ideas. Pain, built up by Exposure and Threat, are the most concentrated concepts at the orientation level, corresponding to what the infants perceive at the virtual cliff. This level could be separated from the intentional (ideational) level, where Pain returns but now is built up by Threat and Firmness. The experimental designer is clearly emerging on the ideational level. Evidently, Hemingway with functionalistic firmness has modelled the exposure of his literary figures at Henry's bar.

When this analysis was performed, the method had been developed to take care of the angled articulation typical of a perspective. This development was well suited for testing the hypothesis that Hemingway is a functionalist and not a behaviourist. The analysis further showed that the functionalistic ideas are permeating both the structure as well as the spatial development of the text. A function is something purely abstract and the articulation forms a right angle, which in strict mathematical terms is meaningless. But despite that the text is just a skeleton, just like the result for the fisherman Santiago in The old man and the sea, there is a structure, which the analysis has revealed. It is quite natural that this structure denotes the core of functionalism. A result over and above this is that the so-called iceberg technique, which is a common description of Hemingway's style, cannot be confirmed. There is no

iceberg, if one means that the larger portion of the textual meaning is to be found under the surface. Maybe it is the reader's projection that produces a hidden meaning.

A second experiment was made on the test item, which was intended to describe the concept of functionalism in the form of a short situation in the earlier mentioned comprehension study. It had been difficult for the students to separate this item from the one describing the behaviourism. It turned out that the intended idea is really described as well as possible, since both a behaviour component and the functional (ideational) component were possible to distinguish from one another. The behaviour level generated concepts that were concentrated in Purity, whereas the ideational level turned out to consist of concepts related to design, which concentrated into Transparency.

It can be concluded that the two texts are different in purpose and genre and have been constructed with an interval of seventy years, yet they both carry an invariant structure of the idea of functionalism. The experiment further shows that the constructor of a material always will have his input into the structure, whether he is aware of it or not. In the case of textual materials, this can now be demonstrated when by means of Perspective Text Analysis it has been possible to separate intention from orientation.

A Longitudinal Experiment on Learning Strategies

Structure is something that must develop evolutionary. Based on this hypothesis literary materials have been empirically ordered according to an evolutionary scale, which represents degrees of difficulty in comprehension. The testing of this hypothesis has been accounted for in the previous section. Below follows a report on an educational schooling program with learning materials of evolutionary significance and consisting of training, whose purpose has been to guide the students' establishment of sensibility to the structure of certain literary texts. The program was carried out as a longitudinal experiment over six terms of study, i.e. three school years.

Sensibility to Schooling

At the turn of the new century, a longitudinal comprehensive experiment, based on the previously described results, was designed and carried out at the same gymnasium school in the city of Lund as described in the previous section. According to the evolutionary scale developed within this project, literary texts were selected as test materials in the course of a modular curriculum, developed for the upper secondary level. Its issue has been to consider the relationship between development and growth by intra-individual comparisons over the three school years. In the first report of a series (B. Bierschenk & I. Bierschenk, 2003a) a thorough description is made of the grounds and procedures for selection of participants.

The fundamental hypothesis has been that persons in developing a learning strategy rely on their ability to coordinate the intentional and orientational properties of an environment, such as a text. These properties will be picked up by an internal "synthesiser" and transformed into mental coordinates, which are forming spaces that can be detected and represented through language production only. The formation of such a space reflects the degree to which the person is sensible to a certain structure. This sensibility may be an indicator of whether the structures picked up are of a descriptive or a reflective kind. Reflection would then be a mark of synthesis. Crucial for the testing was whether structures of descriptive or reflective kind could be discerned in the selected novels and whether the individual student's sensibility to either structure could be discovered.

Two students were finally selected out of groups of students, which were characterised by high and low structural sensibility. It is important to point out that this research program was performed in a *natural environment*. By natural is meant that the teacher and the class

followed the ordinary course and that the students were not aware of the test situations, because the tasks were embedded in the daily work.

Development and growth

It is crucial to consider the difference between developing and growing. *Develop* means to gradually change towards something fuller, greater or better. We can see and follow this process for instance when a child learns to master its body, use tools and acquire its language step by step. The concept of development is linear. *Grow* is a matter of maturation, something that goes on at a more abstract level and can be discovered as an increase in intensity. Growing in humans does not proceed stepwise and linearly but by leaps and therefore it is an evolutionary concept.

In science as well as in the general discussion it is argued that modern man develops in an ever faster rate and that society is endlessly progressing. It may be true in the sense that we learn to master more and more complicated systems in order to produce and communicate material and immaterial things. It may not mean, however, that our kind is expanding in an evolutionary sense. So, even though we are able to have an influence on our development, we cannot interfere in the evolution, because we are comprised in it. And it is the experimenters' view that not all human plants have the same capacity to grow. Instead they have asked themselves which structural limitations the single individual is equipped with to *be able to develop*.

Language is the means by which intellectual development may be brought about. In addition, a reference point is needed before the single individual's potential for development can be studied. What is required is some material to which a person can respond. As presented in the previous section, I. Bierschenk has experimentally found that the understanding of fiction can be graded in relation to the evolutionary based properties of the material. It is not primarily the decoding ability of the reader that governs whether the text material is advanced or simple but instead the conceptual depth communicated. Conceptual levels may exist in a text simultaneously and constitute various attraction levels to various readers, in the study termed structural sensibility. But they could also be identified as structural components on a scale, which evolves in the light of the history of literature.

The empirically found evolutionary scale has five main steps. The first attracts primitive feelings and generates a sense of self-identity. Thereafter follow such connections between text and reader that create a feeling for the concept of myth as separate from reality. At a deeper level the reader is attracted by those situations where he is required to capture ideas and further to read out symbolic conditions. The deepest level reflects individuality and character. A reader who is attracted by this level has reached maturity. It is from the point of view of this scale that the text materials should be considered in the study discussed.

Materials for growing

The interplay between development and growth was studied through two persons, who during six terms (three years) and at five occasions have given a written spontaneous explanation to their understanding of the essential idea in five literary works. Their contents reflect a development from the entry of Christianity into the Scandinavian countries until modern times and should therefore represent an evolutionary relevant scope. The works were the following (evolutionary steps conceptually designated within parentheses):

(1) *The Saga of Gunnlaug Ormstungu* (Primitivism, including Identity, Sensation), (2) *The Dwarf* by Pär Lagerkvist (Myth), (3) *Candide* by Voltaire (Mastery, here: of ideas), (4) *Miss Julie* by August Strindberg (Symbols, here: of naturalism), (5) *Brave New World* by Aldous Huxley (Character, in the sense of Individuality/Maturity).

From an evolutionary point of view, these five works may describe the mental history of the Western world. All of them are concerned with human captivity and the crossing of borders. Each work may therefore be described as interplay between action radius and freedom of thought. The first evolutionary step (1) means an idea about the grip of fate in the lives of people. Nobody can escape his determinate conditions of life. Step two (2) represents all the driving forces of people, especially the power of evil, incarnated by the main character. In step three (3), the idea of freedom gets its physical and mental expression and thus responsibility is brought to a head. Step four (4) is emphasising the genetic and social heritage and the naturalistic problem of crossing borderlines. In the fifth step (5) science has developed to cross the socially and ethically acceptable border and social classes are genetically cultivated, which has as its result a society without morality and thus without motive.

Differences in sensibility

When it comes to the study of change, the time interval between test occasions is usually of importance under the condition that the phenomenon that shall be changed is of a macro type. In a micro perspective, which the method maps out, changes are very small and therefore, quite naturally, time is of little importance. What matters is instead whether a process of adaptation to materials has a long-term effect. It might, namely, be that a sensibility, which did not show up the first time, could appear at a second test occasion, since structural sensibility does not develop in a linear fashion.

The period that followed between the tests proceeded in a linearly composed fashion, with the purpose to integrate various kinds of knowledge over time and thus encouraging a non-linear processing, which is the prerequisite of transformative thinking. The responses of the tested individuals shall be adapted to the five item texts in some way. If an evolutionary change exists in the texts used, the person's own text production should be similar to these texts in some respect. Otherwise one cannot tell that she/he has adapted to the materials, that is, has grown with the task.

The five test occasions were integrated into a modular instructional process. All of them contained a question about the essential idea of the work but each one was formulated according to the special character of the text and its position in the process. In a couple of cases the question was initiating a discussion or the like, in one case it was final, and for the rest it was presented as one of several test items in a written examination. All the test formulations have been synthesis-oriented with the purpose to open up for an analytic-descriptive as well as a synthetic-reflective approach to the text in question.

In five studies, two persons' texts have been examined and their individual results have been discussed and compared in relation to their personal approach at every test occasion (B. Bierschenk & I. Bierschenk, 2003 a, b, c; 2004 a, b). Two reports are summarising the three years as to the students' manifested stability of themes (I. Bierschenk, 2005) and motifs (B. Bierschenk, 2005) over time.

The question to be answered now is: Can a style of approach explain the degree to which a person is able to grow with the task? It turned out that the two persons had a different style of approach, in the studies termed learning strategy.

Text producer (A) is attracted by shallowness and formulates the answers to the test questions according to the action or event level of the literary works. If some development seems to have taken place in (A), it is accidental. The textual extension points to certain changes, where the item texts (2) and (3) seem to have had an influence on the writing style. But thereafter the person returns to a style, which is more superficial and levelled out. The surface-oriented language develops similarly over three years except for a few syntactic varieties, which, however, has no effect on the overall impression.

Text producer (B), who is attracted by deeper relations, uses a reflective and interpreting style. No text emerges as similar to another. There is great variation at the five test occasions, which implies a differentiated style of approach. That this assumption can be made is especially evident from Text (3). The idea of the text was chiselled little by little, as if the person was uncertain about it and did not want to take the risk of making abstract statements. The text is very discrete and proceeds with small steps.

Regarding the question of the students' adaptation to the materials, the information structure of the students' response texts can be summarised as below.

The Saga of Gunnlaug Ormstungu.   Text producer (A) has been attracted to the inevitable fate (Inevitableness), whereas text producer (B) refers to the independence and frankness in somebody who tries to direct the paths of fate (Boldness).

The Dwarf. Text producer (A) concentrates on the main character, who dominates the course of events on the superficial level (Unjust Exercise of Power). Producer (B) instead conceives the steering component in this course (Fabulous Monster), which suggests that the writer understands the romancing mode.

Candide.   The concept (Incapacity) is the structural concentration of the naivety that the main character exhibits, apprehended by (A). (B) is reaching a concept step by step (Product of Mental Activity), denoting that the idea becomes empirically founded during processing.

Miss Julie.   Producer (A) conceives that some kind of out-breaking is made, which is being corrected, however, through adaptation to normality (Correction by Adjustment). When (B) produces (Speciation), it tells that this writer has been able to generate the expected structure, concentrated around the differentiation that the novel human species entails according to the basic idea of naturalism.

Brave New World.   Once again the structure centres round a main character in the production of (A), this time becoming the subject of the writer's admiration (Dignity). The structure of text (B) reasons about society waiting for us if this utopian civilisation will catch us up. (Injustice) in the sense that values of individuals are being invalidated marks the utmost consequence that the new world is facing us with. A perfect adaptation to the inherent structure of the materials.

Since the test materials were selected on the basis of its evolutionary properties, it has been possible to state that development is dependent on structural limits within every single individual. Growth, as being evolutionary, thus comes about in leaps. However, the experiment has demonstrated that one person with very slight textual development has not been sensible to evolutionary relevant properties in the materials after three years, whereas the other person shows a great variability in textual development, corresponding with the change in levels of the materials over time. The AaO-axiom has contributed to detect the biological function of language production, that is, its cyclic and rhythmic development (I. Bierschenk & B. Bierschenk, 2004). Therefore, the method in its latest version is the method for discovering the growth of single persons, an important goal for school and society.

The most striking consequence of this result for education is that a teacher cannot interfere into a process of development. In particular one must take into account that corrections in a student's essay with the purpose to make it "better" intrudes on the personal style of the individual. Trying to "develop" is a mission, which of course may result in cosmetic effects but hardly to an individual's growing with the task.

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